Outside Air Handling Unit With Double Heat Wheel (TYPE-4B)

OA-AHU-T14-01 - Serves Service Apartments Levels T05 to T13
OA-AHU-T14-02 - Serves Service Apartments Levels T05 to T13
OA-AHU-T14-03 - Serves Service Apartments Levels T15 to T32
OA-AHU-T14-04 - Serves Service Apartments Levels T15 to T32
OA-AHU-T14-05 - Serves Service Apartments Levels T15 to T32
OA-AHU-T14-06 - Serves Service Apartments Levels T15 to T32

A) System Description

The system consists of supply fan, extract fan, Enthalpy wheel, Sensible heat wheel, chilled water cooling coil with two port valve, fresh air open/close damper, return air open/close damper, pre-filter and bag filter sections.

B) Supply and Extract Fan control and monitoring

BMS shall control the FAHU only if the H/O/A switch of supply fan and extract fan are in the 'Auto' position and as per the adjustable channels of the time scheduler.

The start-up sequence for FAHU shall be as follows.

First FAHU fresh air damper and return air damper shall be commanded to open. Once damper open status is confirmed via actuator auxiliary switch, FAHU supply fan is switched on.

Once supply fan run status is confirmed to BMS via differential pressure switch **(QBM81-3),** Cooling coil temperature control loop shall be activated and the extract fan is commanded to start. Extract fan run status is confirmed to BMS via differential pressure switch **(QBM81-3).**

Cooling valve control loop shall be interlocked with supply fan run status.

If run status of Supply fan or extract fans is not received from the differential pressure switch within preset delay time of 90 Sec (adjustable) after start command is issued then alarm will be given on the BMS and latched. Both the FAHU fans shall be commanded to stop in such an event.

In the event of BMS giving a start/stop command to AHU supply fan and extract fan, and run status of the same is not established vide respective differential pressure switch after an interrogation time of 1 minute(adjustable), BMS shall raise a AHU supply (or extract) air flow fail alarm. BMS shall disable all commands to the AHU. The AHU shall not run until alarm for the same has been acknowledged and reset from the BMS workstation. The same shall be followed under trip conditions.

The supply and return fans shall be interlocked with each other such that if one fails the other shall also switch off.

The shutdown sequence of FAHU shall be as follows.

First the supply fan and return fans shall be commanded to switch off. Subsequently, dampers and cooling coil valve shall be commanded to close.

Differential pressure switches **(QBM81-5)** shall be installed across the pre-filter & bag filter to monitor the dirty status of the filter. If the pressure across the filters exceeds the pre-determined set point (as recommended by the supplier)(adjustable), BMS shall raise a dirty filter alarm.

C) Temperature Control and monitoring

There shall be a temperature sensor **(QAM2112.200)** installed to measure supply air temperature. Cooling coil valve shall be modulated as per PI (Proportional Integral) logic to maintain supply air temperature at set point (20°C, adjustable from BMS workstation).

There shall be a temperature & humidity sensor **(QFM2160)** installed to measure fresh air temperature & relative humidity. If the measured fresh air temperature goes below the supply air temperature set point and the fresh air relative humidity goes above the preset RH set point (60%RH, adjustable from BMS workstation), then the cooling coil valve shall be modulated as per PI (Proportional Integral) logic to maintain Off coil temperature set point (14°C, adjustable from BMS workstation).

There shall be a combined temperature and relative humidity sensor **(QFM2160)** installed on the downstream to sensible wheel but upstream to enthalpy wheel on extract side. Once supply fan and extract fan run status is confirmed to BMS, BMS shall run the enthalpy wheel if the fresh air temperature is greater than the supply air temperature set point and off sensible wheel temperature is less than fresh air temperature by 2°C.

Once supply fan and extract fan run status is confirmed to BMS, BMS shall run the sensible wheel if the fresh air temperature is less than the supply air temperature setpoint.

Both enthalpy and sensible wheels shall be interlocked with both supply and extract fans.BMS shall also monitor off enthalpy wheel temperature & relative humidity **(QFM2160),** supply air temperature & relative humidity **(QFM2160),** return air temperature & relative humidity **(QFM2160),** exhaust air temperature & relative humidity **(QFM2160)** and chilled water inlet & outlet temperatures **(QAE2112.010).**

D) Fire Alarm

In the event of fire, BMS shall simulate the following action:

(i) Disengage all controls (Switch OFF supply & return fans, enthalpy & sensible wheels, close all dampers)

BMS shall only simulate the above, however MCC (Motor Control centre) will take necessary corrective action through hard wired contacts from the fire alarm panel.

E) Alarms

The followings alarms shall be raised on BMS

S.NO.	ALARM	PRIORITY
1	AHU supply fan air flow fail alarm	High
2	AHU supply fan trip alarm	High
3	AHU return fan air flow fail alarm	High
4	AHU return fan trip alarm	High
5	AHU fresh air damper failed to open alarm	High
6	AHU return air damper failed to open alarm	High
7	AHU pre-filter dirty alarm	Low
8	AHU bag filter dirty alarm	Low
9	Enthalpy wheel trip alarm	Low
10	Sensible wheel trip alarm	Low
11	AHU maintenance alarm	Low

Note:- Maintenance alarms shall be raised based on run hours.

F) TRENDS

The following points shall be trended at every 10 minutes of interval:

i. FAHU fresh air temperature
ii. FAHU fresh air humidity
iii. FAHU supply air temperature
iv. FAHU supply air humidity
v. FAHU return air temperature
vi. FAHU return air humidity
vii. FAHU off coil air temperature set point
viii. FAHU off supply air temperature set point
ix. FAHU cooling coil valve command
x. FAHU cooling coil valve feedback
xi. FAHU chilled water inlet temperature
xii. FAHU chilled water outlet temperature
xiii. FAHU off coil temperature
xiv. FAHU off sensible wheel temperature
xv. FAHU off sensible wheel humidity
xvi. FAHU supply fan run status
xvii. FAHU extract fan run status